SHAFT-HUB CONNECTION

BACKGROUND OF THE INVENTION

1. Field of the invention

The present invention relates to a shaft-hub connection having an attachment flange and a clamping element, particularly a clamping ring, attachable thereto, by means of which the shaft end assigned to the attachment flange may be friction-locked to the attachment flange with a bushing, which takes up a slipping moment, interposed between them.

2. Description of the Related Art

Such a shaft-hub connection known from the related art is used as an overload protector for briefly occurring, particularly high-frequency torque impulses. In this way, the connected machines are protected from the overload damage caused by the torque impulses. This is brought about in that the bushing positioned between the clamping element and the shaft end may absorb a slipping moment which causes the bushing, which is particularly implemented as a bronze bushing, to be able to slip in the attachment flange, the shaft and the hub element assigned thereto remaining untouched by this slipping process.

In the event of slipping through following the occurrence of a short-circuit torque, abrasion typically occurs on one of the sliding surfaces of the bushing, which is coated with a suitable sliding film both on its inner

sliding surface and on its outer sliding surface for this purpose. A disadvantageous effect of this solution is, however, that the arrangement has only a low lifetime in the event of frequently occurring short-circuit torques, because then all sliding surfaces have been "scuffed".

SUMMARY OF THE INVENTION

The present invention is based on the object, starting from this related art, of refining a device of the type initially cited in such a way that the lifetime of the shaft-hub connection is increased.

This object is achieved according to the present invention in that in a shaft-hub connection according to the preamble, the bushing is designed in multiple parts in the axial direction.

The solution of the object according to the present invention is distinguished in that now, due to the bushing divided multiple times in the axial direction, multiple rings, each having separate inner and outer sliding surfaces, have been made, which permit a corresponding number of "scuffing procedures" in the sliding surfaces.

Further preferred embodiments arise from the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is described in greater detail in the following on the basis of a drawing which shows an exemplary embodiment.

Figure 1 shows a first exemplary embodiment of a shaft-hub connection according to the present invention in a side view; and

Figure 2 shows a second exemplary embodiment of a shaft-hub connection according to the present invention, also in a side view.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

According to the first exemplary embodiment shown in Figure 1, the shaft-hub connection comprises an attachment flange 1. Only a section of the attachment flange 1 is shown, which a shaft end 2 runs into.

The attachment flange 1 is implemented in the form of a hub element, a part of the hub element extending out over the shaft end 2. A clamping ring 6, which is used as a clamping element, is attached to the attachment element 1 via attachment means implemented as clamping screws 5. Through the wedge-shaped implementation of the hub element on its outer surface facing the clamping ring 6, a frictional connection of the clamping ring 6 against the hub element is achieved when the clamping screws 5 are tightened. For this purpose, the surface of the hub element is greased in its conical region.

A bushing, implemented from bronze, which is formed by multiple annular bushing elements, four in the exemplary embodiment shown in Figure 1, is positioned between the clamping ring 6 and the shaft end 2. The bushing elements are each coated on their inner sliding surfaces, assigned

to the shaft end 2, and their outer sliding surfaces, assigned to the inside of the hub element of the attachment flange 1. If a short-circuit torque arises due to overload, the shaft 2 may slip through between the bushing 4 and the hub, which is under a clamping effect, using the bushing elements 4. In this way, „scuffing" of the hub on the shaft is avoided. The level of the slipping moment (slip torque) which is to be taken by the bushing in case of overload may be preset in this case. The precision of the presetting is approximately 10 %. In this case, the dispersion of the slip torque is a function of the actual tolerance of the shaft 2. Through the divided construction of the bushing 4 in the form of multiple axially neighboring rings, the bushing itself may absorb the required slip torque even if one or more sliding surfaces of the rings have already been damaged as a consequence of previously occurring overload and „scuffing" of the sliding surfaces caused thereby.

The second exemplary embodiment of the present invention shown in Figure 2 differs from the first exemplary embodiment shown in Figure 1 in the design of the hub and sleeve, respectively, in connection with the attachment element 1. In this case, the hub-sleeve element is implemented in multiple parts, a first hub part being implemented in one piece with the attachment flange 1 and extending over the length of the bushing 4. The other part of the hub is implemented as a sleeve-shaped hub core 3 and assigned to the shaft end 2. In this exemplary embodiment, the bushing 4 works together directly with the hub core 3, the bushing 4 only being divided one time in this exemplary embodiment due to its lower length and therefore including two rings. In this embodiment as well, the bronze bushing 4 receives a slip torque if a

short-circuit torque occurs, shaft 2 and hub core 3 remaining untouched by this slip torque and stress of only the outer or inner sliding surfaces of one of the rings of the bushing 4 occurring. Apart from the mode of operation, which is otherwise identical to the exemplary embodiment shown in Figure 1, the solution of the object shown in Figure 2 is distinguished in that the precision of the slip torque may be increased to ±5 %, independently of the actual shaft tolerance in this case.